DSDC
DLA'S Central Design Activity

Systems Development

Life Cycle

Presented by: DSDC
For more info, send requests to: sepg@dsdc.dla.mil

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Description and Objectives

Description: This course provides an overview of the life cycle for developing/maintaining a software-intensive system based on such standards as the MIL-STD-498 Software Development and Documentation Standard and commercial standards replacing it.

Objectives:

1. Understand the purpose of life cycle standards such as MIL-STD-498 (and replacement standards) and the related DoD 5000 series policies

2. Review the effect of the policies and standards on DLA's systems development life cycle.

3. Explore tailoring options for DLA software development projects

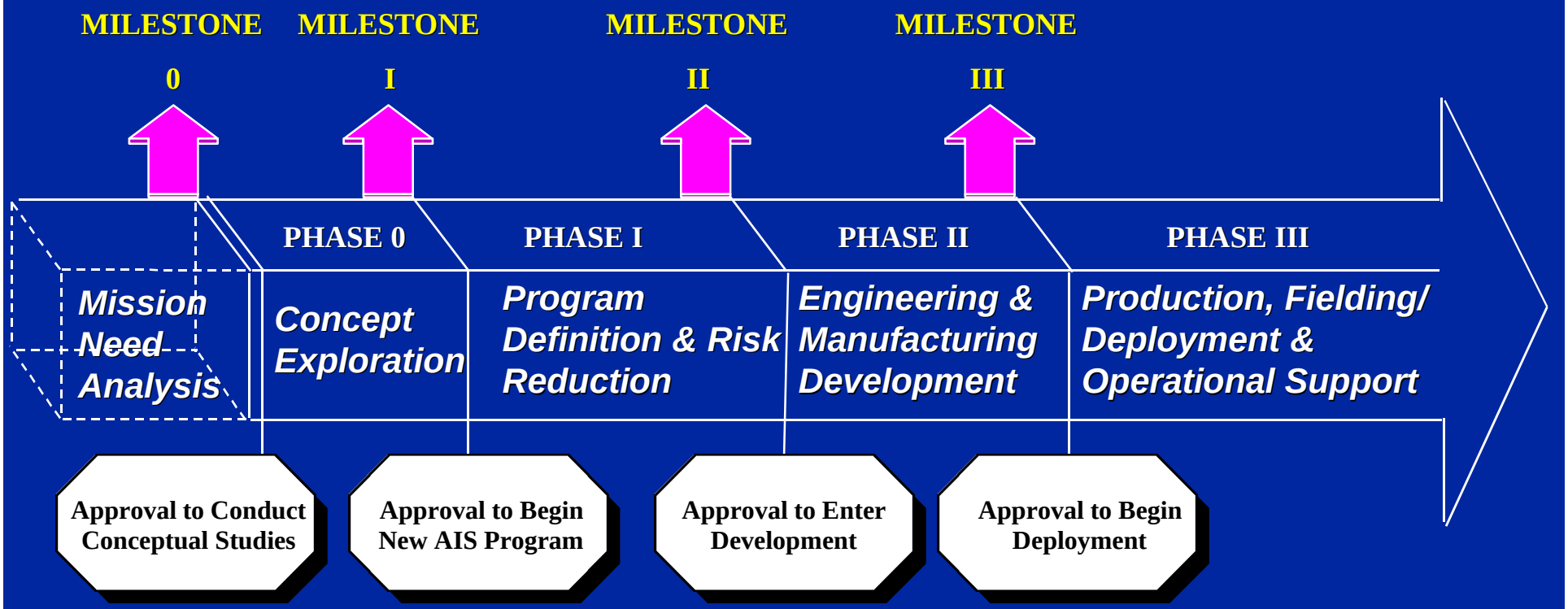
CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

SYSTEMS Life Cycle



CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

SOFTWARE Life Cycle

GRAND DESIGN - a "once through, do each step once" strategy. Simplistically: determine user needs, define requirements, design the system, implement the system, test, fix, and deliver.

INCREMENTAL - determines user needs and defines the system requirements, then performs the rest of the development in a sequence of builds.

EVOLUTIONARY - also develops system in builds, but differs from *Incremental* in acknowledging that the user need is not fully understood and all requirements cannot be defined up front, then are refined in each succeeding build.

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Sample Risk Analysis for Determining Appropriate Life Cycle Strategy

GRAND DESIGN		INCREMENTAL		EVOLUTIONARY	
Risk Item *Reasons against this strategy*	*Risk Level*	*Risk Item* *Reasons against this strategy*	*Risk Level*	*Risk Item* *Reasons against this strategy*	*Risk Level*
• Requirements are not well understood • System too large to do all at once • Rapid changes in mission technology anticipated--may change the requirements • Limited staff or budget available now	H M H M	• Requirements are not well understood • User prefers all capabilities at first delivery • Rapid changes in mission technology anticipated--may change the requirements	H M H	• User prefers all capabilities at first delivery	M
Opportunity Item *Reasons to use this strategy*	*Opp. Level*	*Opportunity Item* *Reasons to use this strategy*	*Opp. Level*	*Opportunity Item* *Reasons to use this strategy*	*Opp. Level*
• User prefers all capabilities at first delivery • User prefers to phase out old system all at once	M L	• Early capability is needed • System breaks naturally into increments • Funding/staffing will be incremental	H M H	• Early capability is needed • System breaks naturally into increments • Funding/staffing will be incremental • User feedback and monitoring of technology changes is needed to understand full requirements	H M H H
				DECISION: USE THIS STRATEGY	

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Needs addressed by MIL-STD-498

- √ Improve compatibility with non-waterfall development methods
- √ Decrease dependence on formal reviews and audits
- √ Decrease emphasis on preparing hard-copy documents
- √ Improve compatibility with CASE tools
- √ Clarify distinction between requirements and design

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

MIL-STD-498 and the CMM

√ Major activities in MIL-STD-498 correspond to many project-level activities in the Capability Maturity Model (CMM) Levels 2 & 3

√ Both tell what, not how

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

MIL-STD 498 Activities

There are 19 Major MIL-STD-498 activities

Some of these are:

1. Project Planning & Oversight
2. Establishing a software development environment
5. Software Requirements analysis
6. Software Design
14. Software configuration management
15. Software quality assurance
18. Joint technical and management reviews
19. Other activities
    a. Risk management
    b. Security and privacy
    c. Subcontractor management

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

MIL-STD-498 DIDs by Type

PLANS

- SDP S/W Development Plan
- SIP S/W Installation Plan
- STrP S/W Transition Plan

CONCEPT/REQUIREMENTS

- OCD Operational Concept Description
- SSS System/Subsystem Specification
- SRS S/W Requirements Specification
- IRS Interface Requirements Specification

DESIGN

- SSDD System/Subsystem Design Description
- SDD S/W Design Description
- IDD Interface Design Description
- DBDD Database Design Description

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

MIL-STD-498 DIDs Cont'd

TEST

STP	S/W Test Plan
STD	S/W Test Description
STR	S/W Test Report

USER/OPERATOR

SUM	S/W User Manual
SIOM	S/W Input/Output Manual
SCOM	S/W Center Operator Manual
COM	Computer Operator Manual

SUPPORT

SVD	S/W Version Description
SPS	S/W Product Specification
FSM	Firmware Support Manual
CPM	Computer Programming Manual

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Data Item Descriptions (DIDs)

- √ Are checklists of information
- √ Are tailorable to project needs and/or Customer's preference
- √ Provide requirements traceability
- √ Aid in proving requirements have been met (Qualified)
- √ Are deliverable if ordered by Customer

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Requirements Traceability

√ System/software requirements must be traced through each phase of the life cycle (from requirements development through test)

√ Backward traceability to the SSS is mandatory

√ Forward requirements traceability from the SSS is optional (expensive, but valuable)

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Joint Reviews

√ More frequent, smaller, more limited in scope

√ GOAL: To find and fix problems through informal, conversational, technical communication between the acquirer organization and the development organization using the natural work products of the development effort.

√ Aligns with DoD 5000 Policy's Integrated Product Team (IPT) approach

CUSTOMER

DSDC

PARTNERS
in Quality Solutions

INDUSTRY

Requirements Qualification

Qualification methods to ensure that requirements have been met (SSS Section 4):

- √ **Demonstration**
- √ **Test**
- √ **Analysis**
- √ **Inspection**
- √ **Special qualification methods**